

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

**IN THE CLAIMS:**

Please **CANCEL** claims 2 and 7 without prejudice or disclaimer, and **AMEND** claims 1, 6 and 23-25, as follows:

1. (CURRENTLY AMENDED) A positive electrode for a rechargeable lithium battery, comprising:

a current collector;

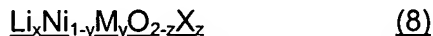
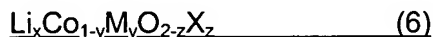
a positive active material layer coated on said current collector, said positive active material layer comprising a positive active material; and

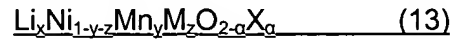
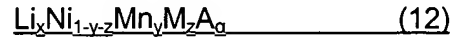
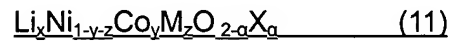
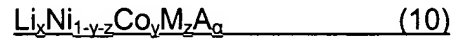
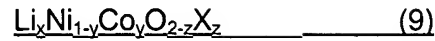
a surface-treatment layer on said positive active material layer such that said positive active material layer is disposed between said surface-treatment layer and said current collector, said surface treatment layer comprising a compound selected from the group consisting of a coating-element-included hydroxide, a coating-element-included oxyhydroxide, a coating-element-included oxycarbonate, and a coating-element-included hydroxycarbonate,

wherein:

the surface-treatment layer does not include lithium,

said positive active material comprises a lithiated compound selected from the group consisting of compounds represented by the formulas 1 to 13:





$$0.95 \leq x \leq 1.1; 0 \leq y \leq 0.5; 0 \leq z \leq 0.5; 0 \leq \alpha \leq 2.$$

M is one element selected from the group consisting of Al, Ni, Co, Mn, Cr, Fe, Mg, Sr, V, and rare earth elements,

A is selected from the group consisting of O, F, S, and P, and

X is selected from the group consisting of F, S, and P.

2. (CANCELLED)

3. (ORIGINAL) The positive electrode according to claim 1, wherein said surface-treatment layer comprises a coating-element selected from the group consisting of Mg, Al, Co, K, Na, Ca, Si, Ti, Sn, V, Ge, Ga, B, As, and Zr.

4. (ORIGINAL) The positive electrode according to claim 1, wherein said surface-treatment layer is formed by coating the positive active material layer with a coating solution.

5. (ORIGINAL) The positive electrode according to claim 4, wherein the coating process includes one of a dipping method and a vacuum impregnation method.

6. (CURRENTLY AMENDED) A method of preparing a positive electrode for a rechargeable lithium battery, comprising:

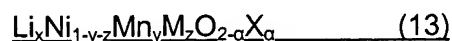
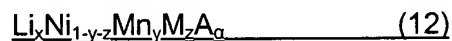
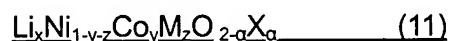
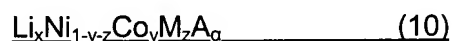
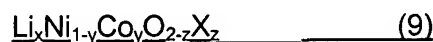
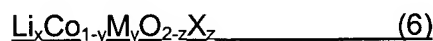
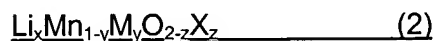
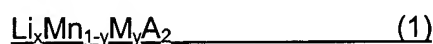
treating the current collector, which is coated with a layer of a positive active material, with a coating liquid, the coating liquid comprising one of a coating element and a coating-element-included compound; and

drying the treated current collector to form a surface treatment layer comprising one of a coating-element-included hydroxide, a coating-element-included oxyhydroxide, a coating-element-included oxycarbonate, and a coating-element-included hydroxidecarbonate,

wherein:

the surface treatment layer does not include lithium,

the positive active material comprises a lithiated compound selected from the group consisting of compounds represented by the formulas 1 to 13:



$$0.95 \leq x \leq 1.1; 0 \leq y \leq 0.5; 0 \leq z \leq 0.5; 0 \leq \alpha \leq 2,$$

M is one element selected from the group consisting of Al, Ni, Co, Mn, Cr, Fe, Mg, Sr, V, and rare earth elements,

A is selected from the group consisting of O, F, S, and P, and

X is selected from the group consisting of F, S, and P.

7. (CANCELLED)

8. (ORIGINAL) The method of claim 6, wherein said drying the treated current collector comprises drying the treated current collector to form one of an amorphous and a crystalline surface treatment layer.

9. (ORIGINAL) The method according to claim 6, wherein a concentration of the coating element in the coating liquid is at or between 0.1 and 50%.

10. (ORIGINAL) The method according to claim 6, wherein said treating the current collector comprises dipping or vacuum-impregnating the current collector in the coating liquid.

11. (ORIGINAL) The method of claim 6, wherein the coating element comprises one of Mg, Al, Co, K, Na, Ca, Si, Ti, V, Sn, Ge, B, As, and Zr.

12. (ORIGINAL) The method of claim 11, wherein a concentration of the coating element in the coating element liquid is at or between 0.1% and 20 wt% of the coating liquid.

13. (ORIGINAL) The method of claim 12, wherein said treating the current collector comprises coating the current collector to form a surface treatment layer having a thickness at or between 1 and 100 nm.

14. (ORIGINAL) The method of claim 6, wherein said treating the current collector comprises:

immersing the current collector in the coating liquid to form a surface treatment layer having a thickness at or between 1 and 100 nm, and  
removing the current collector from the coating liquid to be dried.

15. (ORIGINAL) The method of claim 6, wherein said treating the current collector comprises inserting the current collector coated with the coating liquid in a reduced pressure environment in order to impregnate the coating liquid in pores of positive active material layer to form a surface treatment layer having a thickness at or between 1 and 100 nm.

16. (ORIGINAL) The method of claim 6, wherein said drying comprises drying at a temperature at or between 20°C and 200°C for at or between 1 to 20 hours.

17. (ORIGINAL) A method of preparing a positive electrode for a rechargeable lithium battery, comprising:

coating a current collector with a positive active material composition to form a positive active material layer, the positive active material composition comprising a positive active material selected from the group consisting of lithium chalcogenide, lithium-cobalt chalcogenide, lithium-manganese chalcogenide, lithium-nickel chalcogenide and lithium-nickel-manganese chalcogenide;

dipping the current collector having the positive active material layer in a liquid, the liquid comprising one of A and B; and

drying the treated current collector.

18. (ORIGINAL) The method according to claim 17, wherein a concentration of the liquid is at or between 0.1 and 50%.

19. (ORIGINAL) The method according to claim 17, wherein said drying the treated current collector is performed at a temperature at or between room ambient temperature and 200°C for 1 to 20 hours.

20. (ORIGINAL) A method of preparing a positive electrode for a rechargeable lithium battery, comprising:

coating a current collector with a positive active material composition to form a positive active material layer, the positive active material composition comprising a  $\text{LiCoO}_2$  positive active material;

dipping the current collector having the positive active material layer in a coating liquid, the coating liquid comprising one of A and B; and

drying the treated current collector.

21. (ORIGINAL) The method according to claim 20, wherein the concentration of the liquid is at or between 0.1 and 50%.

22. (ORIGINAL) The method according to claim 20, wherein said drying the treated current collector is performed at or between room ambient temperature and 200°C for at or between 1 and 20 hours.

23. (CURRENTLY AMENDED) A positive electrode for a rechargeable lithium battery, comprising:

a current collector;

a positive active material layer coated on said current collector, said positive active material layer comprising a positive active material selected from the group consisting of lithium-cobalt chalcogenide, lithium-manganese chalcogenide, lithium-nickel chalcogenide and lithium-nickel-manganese chalcogenide; and

a surface-treatment layer on said positive active material layer such that the positive active material is disposed between the surface-treatment layer and the current collector, said surface treatment layer comprising a compound selected from the group consisting of a coating-element-included hydroxide, a coating-element-included oxyhydroxide, a coating-element-included oxycarbonate, and a coating-element-included hydroxycarbonate,

wherein the coating-element is one of Al and B and the surface-treatment layer does not include lithium.

24. (CURRENTLY AMENDED) A positive electrode for a rechargeable lithium battery, comprising:

a current collector;

a positive active material layer coated on said current collector, said positive active material layer comprising a  $\text{LiCoO}_2$  positive active material; and

a surface-treatment layer disposed on said positive active material layer such that the positive active material is disposed between the surface-treatment layer and the current collector, said surface treatment layer comprising a compound selected from the group consisting of a coating-element-included hydroxide, a coating-element-included oxyhydroxide, a coating-element-included oxycarbonate, and a coating-element-included hydroxycarbonate,

wherein the coating-element is one of Al and B.

25. (CURRENTLY AMENDED) A lithium battery comprising:



a first electrode comprising a current collector, a first layer of a lithiated compound, and coated with a surface treatment layer coating the first layer such that the first layer is between the surface treatment layer and the current collector, the surface treatment layer comprising one of a coating-element-included hydroxide, a coating-element-included oxyhydroxide, a coating-element-included oxycarbonate, a coating-element-included hydroxidecarbonate;

a second electrode comprising a material to reversibly intercalate lithium ions; and

a separator and an electrolyte disposed between said first and second electrodes, wherein the surface treatment layer does not include lithium.

26. (ORIGINAL) The lithium battery of claim 25, wherein the coating element comprises one of Mg, Al, Co, K, Na, Ca, Si, Ti, V, Sn, Ge, B, As, and Zr.

27. (ORIGINAL) The lithium battery of claim 25, wherein the surface treatment layer has a thickness of at or between 1 and 100 nm.

28. (ORIGINAL) The lithium battery of claim 25, wherein said first electrode is prepared in accordance with a method comprising:

treating a current collector, which is coated with a layer of a positive active material, with a coating liquid, the coating liquid comprising one of a coating element and a coating-element-included compound; and

drying the treated current collector to form the surface treatment layer comprising one of the coating-element-included hydroxide, the coating-element-included oxyhydroxide, the coating-element-included oxycarbonate, and the coating-element-included hydroxidecarbonate.